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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/084,917 | 03/01/2002 | Yang Wang | ASH-01-004 | 7131 |

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Technology Law Department
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| EXAMINER |
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TSEGAYE, SABA

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| ART UNIT | PAPER NUMBER |
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2662

DATE MAILED: 01/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | | |
|------------------------------|------------------------|--|---|--|
| Office Action Summary | Application No. | | Applicant(s) aa | |
| | 10/084,917 | | WANG, YANG | |
| | Examiner | | Art Unit | |
| | Saba Tsegaye | | 2662 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 March 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities:
 - a) Applicant is required to update the status of applicant cited on page 15.
 - b) The attorney's docket number indicated on page 15 should be deleted, as it is not relevant to the application. See MPEP 608.01.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
3. Claims 2-4 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 2, line 1, the phrase "the router" lacks antecedent basis.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

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5. Claims 1-5, 16, 17, 19-21, 23 and 27 are rejected under 35 U.S.C. 102(e) as being anticipated by Ayres (US 6,687,220).

Regarding claim 1, Ayres discloses, figs. 1-2, a routing system (20) comprising: a plurality of routing resources (CPU, routing domain, flow rates) and a plurality of virtual routers (VRIs 50 and 52) configured to share selected ones of the routing resources (a single processing unit; a communication interface 40 (DSPs); DRAM).

Regarding claim 2, Ayres discloses the routing system wherein the routing resources include logic resources (CPU; a communication interface 40 (DSPs)) and physical resources (ingress data queue; flow rate; routing domain).

Regarding claim 3, Ayres discloses the routing system wherein the logical resources include routing processes (a communication interface 40) and forwarding process (the CPU selectively retrieves packets from the ingress data queues and forwards them).

Regarding claim 4, Ayres discloses wherein the physical resources include control resources (each VRI 50 and 52 have its own routing domain; ingress data queues 48 formed as linked lists in the DRAM 46 (shared)) and data resources (the respective packet flow rates of the ingress data queues associated with the each VRI are independently adjusted; the system resources of the router 20 can be fairly distributed or restricted and individual user or VRI bandwidth guarantees (column 7, lines 29-59)).

Regarding claim 5, Ayres discloses the routing system wherein the shared selected ones of the routing resources includes routing processes (40), forwarding processes (CPU), control resources (ingress data queues 48 formed as linked lists in the DRAM 46), and data resources (the system resources of the router 20 can be fairly distributed or restricted and individual user or VRI bandwidth guarantees (column 7, lines 29-59))

Regarding claim 16, Ayres discloses a method comprising: allocating a first set of resources as shared resources (a communication interface 40 and a single control function (CPU), DRAM); allocating a second set or resources as non-shared resources (each VRI have its own routing domain; flow manager 54 controls the packets flow rates); and implementing a plurality of virtual routers (VRI 50 and 52) based on a sharing of resources from the first set of resources between the virtual routers (a single control function) and based on independently assigning resources of the second set of resources to the virtual router (the respective packet flow rates of the ingress data queues associated with the each VRI are independently adjusted; each VRI 50 and 52 have its own routing domain).

Regarding claim 17, Ayres discloses the method wherein the first and second sets of resources are implemented by a single physical router system (see fig. 1, router 20).

Regarding claim 19, Ayres discloses the method wherein the resources of the first and second set of resources include logic resources (a communication interface 40 and a single

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control function (CPU)) and physical resources (each VRI have its own routing domain; flow manager 54 controls the packets flow rates).

Regarding claim 20, Ayres discloses the method wherein the logic resources include routing processes (a communication interface 40, comprising a plurality of a software configurable DSPs 42 that processes (demodulates) upstream packets) and forwarding process (CPU selectively retrieves packets from the ingress data queues and forwards the retrieved packets to output queues).

Regarding claim 21, Ayres discloses the method wherein the physical resources include control resources (each VRI have its own routing domain) and data resources (flow manager 54 controls the packets flow rates).

Regarding claim 23, Ayres discloses a routing system comprising: means for performing routing processes (communication interface 40); means for performing forwarding process (CPU 44); means for implementing control resources (CPU 44); means for implementing data resources (Flow Mgr 54); and means for running a plurality of virtual routers (VRI 50 and 52) that share selected ones of the means for performing routing processes, the means for implementing control resources and the means for implementing data resources (router 20; column 4, lines 28-40).

Regarding claim 27, Ayres discloses the routing system wherein the means for implementing data resources includes means for implementing a port bandwidth of the routing system (the respective packet flow rates of the ingress data queues associated with each VRI are independently adjusted).

6. Claims 8-14 are rejected under 35 U.S.C. 102(e) as being anticipated by Alfieri et al. (US 2002/0099849).

Regarding claim 8, Alfieri discloses a network point-of-presence comprising: a physical router (14) system having a plurality of resources (routers; routing tables; communication links; memory; a mapping table; OSPF (*that is used to calculate routes by the number of routers, transmission speed, delays and route cost*); BGP (*BGP is a Gateway Protocol which routers employ in order to exchange appropriate levels of routing information*) etc.); at least one backbone router (VBR 22) implemented as a virtual router by the physical router system (14); and at least one regional router (VAR 20) implemented as a virtual router by the physical router system (14), wherein the backbone virtual router (22) and the regional virtual router (20) share resources of the physical router system (see figs. 2-5; 0033-0036).

Regarding claim 9, Alfieri discloses the network POP further comprising: ports connecting the backbone virtual router to a high capacity transit network (fig. 2, backbone links 18); and ports connecting the regional router to a metropolitan area network (links 16).

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Regarding claim 10, Alfieri discloses the network POP wherein the physical router is a single physical router (router 14).

Regarding claim 11, Alfieri discloses the network POP wherein the plurality of resources includes logic resources (0032, 0037) and physical resources (routing tables, communication links).

Regarding claim 12, Alfieri discloses the network POP wherein the logic resources include routing processes (0037) and forwarding processes (0032).

Regarding claim 13, Alfieri discloses the network POP wherein the physical resources include control resources (each VAR 20 has its own routing table; the VBR 22 maintains a full BGP routing table (0023-0024, 0036)) and data resources (see fig. 4 and 5).

Regarding claim 14, Alfieri discloses the network POP wherein the control resources include at least one routing table (each VAR 20 has its own routing table; the VBR 22 maintains a full BGP routing table (0023-0024, 0036) and the data resources include transmission bandwidth of at least one port of the routing system (as shown in fig. 4, a number of physical interfaces 50 connect to the access links 16 and 18 (ports). Examples of such interfaces include Ethernet interfaces, SONET interfaces etc.).

7. Claims 1 and 2 are rejected under 35 U.S.C. 102(e) as being anticipated by Ylonen et al. (US 2002/0062344).

Regarding claim 1, Ylonen discloses, in Fig. 1b, a plurality of virtual routers 110-112 (claimed a plurality of virtual routers) that use the **same hardware**, (i.e. the physical input lines and output lines) and **same processor** 116 (claimed a plurality of routing resources). The virtual routers are separate entities and suitable multiple access scheme is applied to **share the common physical resources** between them (0004).

Regarding claim 2, Ylonen discloses the routing system wherein the routing resources include logic resources (processor) and physical resource (same physical input lines 114, output lines 115).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 7 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ayres.

Ayres discloses all the claim limitations as stated above except for the shared resources are user programmable. However, it would have been obvious to one ordinary skill in the art at the time the invention was made to use software-based machines. The benefit of using user programmable is that programs can be changed and upgraded and new futures are added easily than hardware changes.

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10. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Alfieri et al.

Alfieri discloses all the claim limitations as stated above. Further, Alfieri in fig. 4 shows a high-level software and hardware organization for the routers 14. However, Alfieri does not expressly disclose that the resources shared between the backbone virtual router and the regional virtual router are modifiable by a user.

It would have been obvious to one ordinary skill in the art at the time the invention was made to use user programmable system. The benefit of using user programmable is that programs can be changed and upgraded and new features are added easily than hardware changes.

11. Claims 6, 22, 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ayres in view of Alfieri et al. (US 2002/0099849).

Ayres discloses all the claim limitations as stated above. Ayres, further, discloses that the router 20 includes **a shared buffer memory 46** and each VRI 50 and 52 have its **own routing domain** (as in claim 26). However, Ayres does not expressly disclose the control resources include at least one routing table.

Alfieri teaches several virtual access routers 20 and virtual backbone router 22 that are associated with respective customers. Each VAR 20 has its own routing table and runs its own instances of the routing protocol. The VBR 22 generally maintains a full BGP routing table. Further, Alfieri teaches that wide-area network 10 may employ routing protocols such as BGP, OSPF, RIP, etc. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add routing table, such as suggested by Alfieri, to the VRI of Ayres in order to provide an efficient and reliable communication system.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Terrell et al. (US 2003/0210686 A1) discloses router and Methods using network addresses for virtualization.


Watson et al. (US 2003/0051048 A1) discloses a system and method for router virtual networking.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Saba Tsegaye whose telephone number is (571) 272-3091. The examiner can normally be reached on Monday-Friday (7:30-5:00), First Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan Kizou can be reached on (571) 272-3088. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ST
January 20, 2006


JOHN PEZZLO
PRIMARY EXAMINER